Temperature at Tokio,' by W. Oishi, based on the records taken between 1886 and 1902; 'Température moyenne annuelle de la Surface de la Mer dans l'Océan Pacifique Occidental,' by Y. Wada, based on observations from 1882 to 1901, and illustrated by means of monthly and annual isothermal charts; 'The Epochs of the First Ice in Japan for 1902,' by T. Okada, with a chart; and 'Evaporation in Japan,' by T. Okada, which is a contribution of considerable general interest and importance. The present *Bulletin* is the first of a series of publications which are to appear under the title *Bulletins of the Central Meteorological Observatory of Japan.* These bulletins are to be issued at convenient intervals, and are to contain the results of researches on meteorology and allied sciences made by the members of the observatory. It is intended that observations, and their discussion, on special subjects not included in the routine work of the service, shall also be published. The present volume, with the promise of those issues which are to follow later, indicates a high degree of activity in meteorological work in Japan.

VIENNA METEOROLOGICAL OBSERVATORY.

THE annual volume of the *Central-Anstalt für Meteorologie und Erdmagnetismus* in Vienna (1902, date of publication 1904) gives evidence of a constantly expanding sphere of activity of this observatory, under the able directorship of Dr. J. M. Pernter. Among the noteworthy data contained in this publication are the results obtained by means of self-recording instruments on the Sonnblick and Obir (two stations); at Tragöss, the interesting 'North Foehn' station; at Beirut, Jerusalem and Port-au-Prince. Dr. Felix M. Exner has been taken on to the regular staff of the central observatory, and has also recently been appointed *Privat Docent* in meteorology at the University of Vienna. Dr. Exner recently spent several weeks in the United States, making a study of our meteorological equipment at Washington, Blue Hill and other places, and of the methods and illustrations employed in teaching meteorology at Harvard and elsewhere. His work in teaching at Vienna will help to give that city added prestige as a meteorological and climatological center. A supplement to the present volume, which was published some months ago, deals with the question of 'weather shooting,' and was reviewed in these columns.

MOUNTAIN SICKNESS.

Mosso, who has made a considerable study of the physiological effect of higher altitudes, contributed two papers to the *Atti dei Lincei,* for June 19 last, which, according to the abstract published in *Nature,* of August 4, tend to disprove the assumption that the difficulties experienced are due solely to the diminished tension of the oxygen in the air. Mosso now shows that when the barometric pressure of a mixture of oxygen and nitrogen is diminished to one third of an atmosphere, while the proportion of oxygen is increased until its partial pressure is the same as under ordinary circumstances, severe inconvenience, abnormal respiration and pulse action result. That this is not due merely to the increased proportion of oxygen has been shown by a study of the effects produced by breathing pure oxygen on the summit of Monte Rosa. Blood analyses indicate that a diminution in the proportion of carbon dioxide, caused by the low pressure, is probably responsible for the result. This view is upheld by the fact that a mixture of oxygen and carbon dioxide, containing 20 per cent. of the latter, which resulted in dizziness and nausea when breathed at Turin, was attended by sensations of ease and pleasure when breathed on Monte Rosa.

R. DEC. WARD.

NOTES ON INORGANIC CHEMISTRY.

CONDITION OF HELIUM IN PITCHBLENDE.

R. J. Moss recounts in the *Comptes Rendus* an attempt to determine the condition in which helium exists in pitchblende. The mineral was powdered in a vacuum. The chief substance set free was water vapor, and it was accompanied by small quantities of helium, carbon dioxid, nitrogen and oxygen. While about one half of the gas set free, exclusive of water, was often helium, yet the

amount was only about one per cent. of the total helium in the mineral. In one instance 0.7 per cent. of the gas obtained was hydrogen, which Moss thinks may have been the product of the action of radium upon the water present. The conclusion drawn is that the helium exists in pitchblende in a free state, enclosed in exceedingly small cavities.

HELIUM IN MINERALS FROM GREENLAND.

An investigation has been made by Julius Thomsen of the gases contained in a fluorspar from Greenland, containing fluorids of the rare earths. At a red heat a kilo of the spar gave off about 800 cubic centimeters of gas, 715 of which were carbon dioxid, probably due to the presence of ferrous carbonate. The other 85 cubic centimeters consisted of hydrogen, carbon monoxid, hydrocarbons and 24–27 cubic centimeters of helium. When the mineral was treated, prior to heating, with hydrochloric or nitric acid, or both, while the carbon dioxid was reduced to about 40 cubic centimeters, the amount of helium remained unchanged. The same was true even after treatment with concentrated sulfuric acid, or fusion with caustic potash. From these experiments Thomsen concludes that if the helium is not free, it must be present in an extraordinarily firm compound. Other minerals from Greenland containing rare earths were also examined, including steenstrupite, eudialyte and a silicate from Ivigtut, and while much gas was often evolved, no trace of helium was found. The same was true of a green fluorspar from England, which gave on heating a blue fluorescence.

CONDUCTIVITY OF RADIUM SOLUTIONS.

It would not be surprising, in view of the ionizing power and high atomic weight of radium, if its salts showed an abnormal conductivity in solution, but recent experiments of Kohlrausch and Henning indicate that this is not the case. Assuming the atomic weight of radium as 225 and working with about 8 milligrams of the bromid, they find the molecular conductivity and the migration velocity of the radium ion to be very close to that of barium, and not far from that of strontium and calcium. If the atomic weight of radium be 258, as claimed by Runge and Precht, these values become only a little higher. They consider this as a new example of the small part played by the atomic weight in determining the characteristics of a salt.

METALS IN MINERAL WATERS.

Much has been written on the therapeutic action of the heavy metals in mineral waters, and a new suggestion has been put forward by Garrigou in the *Comptes Rendus*. After submitting the water of the old Eaux-Bonnes spring to prolonged dialysis, he finds the larger part of the heavy metals in the undialyzable portion; that is, they are present in a colloidal form, doubtless in organic combination. He considers that these metallic compounds are of the nature of oxydases and play an important part in the therapeutics of mineral water. This discovery would seem also to be of importance in water analysis, since these metals would not react with the ordinary reagents for metals in solutions, and complete destruction of all organic matter in the water would thus be an indispensable preliminary step before the determination of at least any heavy metals.

ACTION OF METALS ON FERMENTATON.

An interesting series of experiments by Leopold Nathan are described in the *Centralblatt für Bakteriologie und Parisitenkunde,* made in the effort to determine how far metals and metal containers have an inhibitory action upon fermentation processes. The experiments were carried out by immersing pure metals in the form of thin cylinders in the fermenting liquid. Both cider and beer were used. In the case of cider, in general more of the metal passed into solution, but the ferment was more resistant. The liquid remained clear during and after the fermentation. Beer was much more sensitive. With the iron cylinder, a grayish sheen was visible in the liquid, which during the fermentation became inky, and finally a black precipitate appeared. German silver, copper, zinc, brass and bronze had a decidedly strong inhibitory action upon the fermentation, while tin and

lead were moderately toxic. On the other hand, polished iron, silver, gold, polished tin, aluminum, nickel and a few alloys, as well as celluloid, glass, and hard rubber, had little or no effect. In metals, the smoothness of surface seems to have a decided influence.

BIOCHEMICAL REACTIONS FOR TELLURIUM AND SELENIUM.

IT has long been known that certain microorganisms are capable not only of living in arsenic solutions, but of reducing arsenic compounds to volatile gases containing arsenic. It has indeed been supposed by many that the chief danger to be apprehended from arsenical wall papers is the production of such poisonous gases by molds. This study has been applied by Professor Gosio, of Rome, to compounds of tellurium and selenium, chiefly to tellurites and selenites. The former are much more susceptible to the action of micro-organisms than arsenic compounds, showing a decided brown or violet coloration with *Hyphomycetes* under favorable circumstances within two or three minutes. The tellurites also react with the *Schizomycetes* and various bacteria, often giving black precipitates. The compounds formed depend upon the particular kind of microorganism used. The selenites are decomposed almost as rapidly, giving with cultures of the colon bacillus a red coloration in six minutes. The coloration is probably due to the precipitation of metallic selenium. These reactions are suggested for the purpose of detecting certain microorganisms.

SOURCE OF NORMAL ARSENIC IN THE BODY.

Now that it is well established that arsenic is a normal constituent of the human body, it becomes of interest to know its source, and this problem has been studied by Gautier, to whom we owe so much of our knowledge regarding the detection and determination of minute quantities of arsenic. In conjunction with Clausmann he has analyzed a large number of foods, and the following are some of his results. The figures represent the number of micrograms (= 0.001 milligram) in 100 grams of substance; that is, parts per million.

Fresh beef	0.7–0.8
Fresh veal	0.5–1
Milk	less than 0.05
White of egg	none
Yolk of egg	0.5
Mackerel	2.7–3.9
Crab, muscle	2.2
" egg and fat	35.7
" shell	104
" whole animal	45.3
Corn	0.7–0.85
Wheat bread	0.71
Cabbage	0.2
String beans	none
Potatoes	1.12
Burgundy wine	0.27
Beer	0.01
Water of the Seine	0.5
Sea water, surface	1.1
" " 10 meters deep	2.5
White salt	0.7
English salt	15
Gray salt	45
Rock salt	14
" " from Stassfurt	2.6

Gautier draws the following conclusions: Muscle contains very little arsenic in comparison with certain organs, and this can be considered as circulating rather than fixed arsenic; great variations are found in the flesh of the same species of animal, in fish unquestionably due to the varying arsenic of the sea and to the food; of man's food, certain fish and crustaceans, and gray salt are richest in arsenic, but in general the chief sources are wine, water and salt; some foods contain no trace of arsenic, so that it can not be held that arsenic is universally present, or that it is a constant constituent of the living cell. From Parisian statistics for ten years, it may be considered that a man ingests 20.9 micrograms of arsenic per day, or 7.66 milligrams per year. In medico-legal cases, it is recommended that only such organs as normally contain arsenic merely in traces, be examined, as the liver, spleen, muscle and washed intestine. If the contents of the intestine show more than one tenth of a milligram of arsenic, we may be sure it did not come from normal food.

J. L. H.